UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,271	09/28/2005	Masahiro Tada	09792909-6378	4665

26263 7590 02/03/2011

SNR DENTON US LLP
P.O. BOX 061080
CHICAGO, IL 60606-1080

EXAMINER	
TSAI, H JEY	

ART UNIT	PAPER NUMBER
2895	

MAIL DATE	DELIVERY MODE
02/03/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,271	TADA ET AL.	
	Examiner	Art Unit	
	H.Jey Tsai	2895	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 November 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ouellet 6,635,509, newly cited, in view of Brunner 2005/0221528, previously cited, Murakami 4,838,088 and Wolf, vol. 1, pages 331-332, previously cited.

The references teach the feature:

Ouellet discloses a method for manufacturing a micromachine including an oscillator, comprising:

a step of forming a sacrifice layer around a movable portion ISDP of the oscillator (MEMS, resonator, actuator), figs. 13, 14b-14l, col. 9, lines 45-67, col. 10, lines 1-67 (some of fig. 14's first steps are exact copies of cited prior art, see col. 10, lines 48-49), col. 1, lines 5-44,

the sacrifice layer comprising silicon oxide, col. 9, lines 45-67, col. 10, lines 1-47, col. 10, lines 48-49, col. 11, lines 1-67, see para. 10 of Brunner: preferably the silicon oxide is silicon dioxide,

a step of covering the sacrifice layer with an overcoat film (encapsulation structure), fig. 14m,

followed by the formation of a penetrating hole reaching the sacrifice layer in the overcoat layer, fig. 14n, col. 13, lines 5-67,

a step of performing sacrifice-layer etching for removing the sacrifice layer using the penetrating hole in order to form a space around the movable portion, figs. 14o, 14p, col. 13, lines 5-67,

a step of performing a film-formation treatment at a reduced pressure (vacuum and sputtering) following the sacrifice-layer etching so as to form a sputtering layer that seals the penetrating hole which is formed into at least one wire (interconnects) over the overcoat film (encapsulation), figs. 14q-14t, col. 14, line 1-67, and see Brunner at para. 46, 50, 60, the film-formation treatment at a reduced pressure is a film-formation treatment by sputtering aluminum to seal the penetration hole. Murakami teaches at figs. 9F-9H, 3E, col. 4, lines 20-28,using sputtering metal 28 in vacuum to seal the penetration hole 59 or 27 which is formed into at least one wire 28 over the overcoat film 58, 59 and into the wiring layer 28 (upper electrode) to connect to layer 30,

wherein the sputtering layer is composed of one selected from the group of an aluminum copper film And an aluminum silicon film (aluminum alloy, Al-Cu, col. 14, lines 21-22, col. 11, lines 11-25), col. 14, line 21-67, and see Murakami teaches at figs. 9F-9H, 3E, col. 4, lines 20-28,using sputtering metal 28 in vacuum to seal the penetration hole 59 or 27 which is formed into at least one wire 28 over the overcoat film 58, 59 and into the wiring layer 28 (upper electrode) to connect to layer 30, Wolf teaches at vol. 1, pages 331-332, aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application.

Regarding claim 2, wherein the method is applied to a micromachine having means for driving oscillation in the oscillator, para. 26, 46 of Brunner.

The difference between the references applied above and the instant claim(s) is: Ouellet teaches using aluminum alloy (Al-Cu) for film-formation treatment in vacuum to seal the penetration hole and forming an interconnects over covering layer. However, Murakami teaches at figs. 9F-9H, 3E, col. 4, lines 20-28,using sputtering metal 28 in vacuum to seal the penetration hole 59 or 27 and into the wiring layer (upper electrode) to connect to layer 30. Bruner also teaches at para. 10, preferably the silicon oxide is silicon dioxide; when silicon oxide is referred to in this document, silicon dioxide is the most preferred embodiment, although conventional, doped and/or non-stoichiometric silicon oxides are also contemplated. Brunner teaches at para. 46, 50, 60, the film-formation treatment at a reduced pressure is a film-formation treatment by sputtering aluminum to seal the penetration hole. Wolf teaches at vol. 1, pages 331-332, aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application because they posse enhanced properties for interconnect requirement.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Ouellet's teachings' process by using sputtering metal for sealing the penetration hole and as a wiring layer as taught by Murakami because the electrical connection can be made from penetration hole to other circuits formed on the same substrate.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using silicon dioxide layer, a circuit for driving the MEMS oscillator/actuator and using sputtering for forming aluminum alloy as taught by Brunner because silicon dioxide is most common form of silicon oxide, and oscillator/actuator can be a functional device by connecting to a driving circuit, and sputtering metal deposition is a common process in the semiconductor industry.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above Ouellet's teachings' process by using sputtering deposition for metal deposition and using conventional aluminum alloy including aluminum copper or aluminum silicon for metal film formation as taught by Wolf et al. because both aluminum copper and aluminum silicon posse enhanced properties for interconnect requirement in microelectronic application so that all metal layers in the microelectronic mechanical device would have enhanced aluminum property.

Claims 3-4 are rejected under 35 U.S.C 103 as being unpatentable over Ouellet in view of Brunner, Murakami and Wolf as applied to claims 1-2 above, and further in view of Zurn 6,621,134, and Schmid 6,761,068, previously cited, and Carley 7,008,812, newly cited.

The difference between the references applied above and the instant claim(s) is: Brunner in view of Murakami and Wolf et al. teaches forming a MEMS device having an

oscillator but does not teach the means for driving the oscillation. However, Zurn teaches at figs. 4A-4B, 10, 11, 14, 15, 19, an electrostatic capacitive MEMS structure for driving a resonator (oscillator) and sealing penetration hole 144 with metal. Schmid teaches at col. 4, lines 1-12, means for driving oscillation are static electric or piezoelectric. Carley teaches at figs. 8B, 9A-9B, col. 1, lines 18-67, col. 3, lines 20-67, co. 5, lines 20-47, forming interconnect layer (wiring) 26 over covering layer to contact pad with CMOS circuit for driving MEMS accelerometer/oscillator

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by using static electric or piezoelectric for driving oscillation as taught by Zurn and Schmid because static electric and piezoelectric would cause the movable portion of the device to oscillate so that a oscillation is formed.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings by forming a circuit for driving the MEMS oscillator/actuator as taught by Carley so that oscillator/actuator can be a functional device

Conclusions

Applicant's arguments filed Nov. 23 2010 have been fully considered but they are not persuasive.

Newly cited reference Ouellet and Carley teach forming a wiring (interconnects) over the overcoat film as set forth above.

Bruner at para. 46, performing a film-formation treatment by sputtering to seal the penetration hole under vacuum, hence, it clear that Bruner teaches performing a film-formation treatment by sputtering at a reduced pressure.

Murakami teaches at figs. 9F-9H, 3E, col. 4, lines 20-28,using sputtering metal 28 in vacuum or less than 10 torr to seal the penetration hole 59 or 27 and into the wiring layer (upper electrode) to connect to layer 30.

And, a combination of familiar elements according to know methods to yield predictable results is obvious. Agrizap, Inc. V. Woodstream Corp., 520 F.3d 1337, 86 U.S.P.Q. 2d 1110 (Fed. Cir. 2007).

Ouellet teaches forming an aluminum wiring (interconnects) in vacuum over the overcoat film, Bruner teaches using sputtering aluminum for film-formation treatment in vacuum to seal the penetration hole, Murakami teaches using sputtering metal in vacuum to seal the penetration hole and into the wiring layer, Wolf teaches aluminum alloy including Al-Cu and Al-Si are more frequently used than pure aluminum in microelectronic application, Zurn teaches an electrostatic capacitive MEMS structure for driving a resonator (oscillator) and sealing penetration hole with metal. Schmid teaches means for driving oscillation are static electric or piezoelectric, Carley teaches forming a driving CMOS device for connecting to the wiring (interconnects) formed over the overcoat layer, hence the combination of Ouellet, Bruner, Murakami, Zurn, Schmid and Carley is proper. Therefore, it is clearly that the combination of Ouellet, Bruner,

Murakami, Zurn, Schmid and Carley meets the doctrine of U.S. Supreme Court in KSR international v. Teleflex of "a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability". And, it is also clearly that the combination of Ouellet, Bruner, Murakami, Zurn, Schmid and Carley meets the doctrine of U.S. Supreme Court in KSR international v. Teleflex of "If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103". Also see MPEP §2143.

It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle. See KSR international v. Teleflex, US Supreme Court, 127 S.Ct. 1727 (2007). And, see Ball Aerosol v. Limited Brands, Inc., 555 F.3rd 984, 89 U.S.P.Q. 2d 1870 (Fed Cir. 2009). Boston Scientific Scimed, Inc. v. Cordis Corp., 554 F.3d 982, 89 U.S.P.Q. 2d, 1704 (Fed. Cir. 2009).

More details of U.S. Supreme Court in KSR international v. Teleflex, US Supreme Court, 127 S. Ct. 1742, 82 USPQ 2d at 1390. Granting patent protection to advances that would occur in the ordinary course without real innovation retards progress and may, in the case of patents combining previously known elements, deprive prior inventions of their value or utility. When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product

not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under §103.

When a work is available in one field, design incentives and other market forces can prompt variations of it, either in the same field or in another. If a person of ordinary skill in the art can implement a predictable variation, and would see the benefit of doing so, §103 likely bars its patentability. Moreover, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond that person's skill.

It is common sense that familiar items may have obvious uses beyond their primary purposes, and a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle. See KSR international v. Teleflex, US Supreme Court, 127 S.Ct. 1727 (2007).

In *Sakraida* v. *AG Pro, Inc.*, 425 U. S. 273(1976), the Court derived from the precedents the conclusion that when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious. *Id.*, at 282. The principles underlying these cases are instructive when the question is whether a patent claiming the combination of elements of prior art is obvious. When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same

reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from: Monday: 7:00 am-4:00 pm; Tuesday: 7:00am- 4:00pm; Friday: 7:00 am-11:00am. Tuesday & Wednesday are off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Richards, 571-272-1736.

The fax phone number for this Group is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/H.Jey Tsai/
Primary Examiner, Art Unit 2895
2/1/2011